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saepe confluentibus, magnitudine varie, subarescentibus, ochraceis, subconcolori vel fusco marginatis, in pagina inferiore e contrario indeterminatis, ochro-griseis, obscuriore cinctis; peritheciis hypophyllis, sparsis, minutis, punctiformi-sublenticularibus, atris, pertusis; sporis bacillaribus vel cylindraceis, utrinque subrotundatis, curvulatis, uniseptatis, hyalinis, 30-32 mm. long., 2.5 mm. crass.—A. *Septoria salicicola* Sacc. in *Michelia* I. p. 171. (*Depazea salicicola* Fr.) cum sporis 40-50 mm. long., 3 mm. crass., triseptatis et *Septoria Populi* Desm. cum sporis 45 mm. long., 3 mm. crass., sporum magnitudine et ab prima septatione longe diversa.

Albany, New York, ad *Salicis lucidæ* Muhl. folia viva. Aug. 1878. Leg. Ch. H. Peck

SEPTORIA QUERCETI THUEM.—S. peritheciis hypophyllis, numerosissimis, densissime gregaris, minutis, nitido-atris, immersis, epidermide pustulæformi tectis postremo vix liberis, punctiformibus, maculas plus minusve suborbiculatas, translucentes efficiens; sporis numerosis, subrectis vel arcuatulis, cylindraceis, utrinque obtusatis, bi-quadriseptatis, multinucleatis, hyalinis, 18-22 mm. long., 2.5-3 mm. crass.

Aiken, Carolina australis, ad *Quercus tinctoriæ* Willd. folia subviva vel arida. No. 2227. Leg. H. W. Ravenel.

QUERCUS LEANA, NUTT.—In an article on the "Oaks of the Potomac side" which I contributed to *Field and Forest* for October and November, 1865, occurs the following remark: "Two trees which I have recently discovered in a wood near the northwestern (northern) corner of the District of Columbia, have proved unusually interesting. That these should be called *Quercus Leana* and not *Q. heterophylla* I maintain for the following reasons: Their resemblance to *Q. heterophylla* as it exists in the herbarium of the Department of Agriculture is not sufficiently close to warrant this name, the leaves being broader and less lobed. They do agree substantially with the specimens of *Q. Leana* in that herbarium. They also agree remarkably well with the tree which Mr. W. R. Smit, Superintendent of the U. S. Botanical Garden has raised in his grounds from an acorn of *Q. imbricaria*. Finally, on considering the locality in which these trees were found, it seems impossible to believe that *Q. Phellos* can have entered into the combination. In the entire wood where they are situated not an individual of that species exists. It is wholly wanting throughout the region of Rock Creek on which the grove is located. On the contrary the prevailing oak there is *Q. imbricaria*, although both varieties of *Q. coccinea* are also frequent. It cannot therefore be justly claimed that this new discovery constitutes a revival of the famous Bartram's Oak since this was decided on the highest authority to be either a form of *Q. Phellos* or a union of that species with *Q. coccinea* var. *tinctoria*. It is, however, none the less a botanical curiosity."

Since the above was published I have re-visited the locality no less than five times and have succeeded in obtaining an abundance both of fruiting and flowering specimens, of which I may say, *en passant*, I have a supply for distribution and exchange. My latest visit was

made a few days ago, this time in company with Dr. George Vasey, Botanist of the Department of Agriculture. As there has been of late a perhaps somewhat healthy reaction against the hybrid theory, doubtless too often invoked in explanation of aberrant and intermediate forms, I will briefly describe our conjoint observations upon the oaks in the vicinity of the trees to which reference has already been made. Our problem was if possible to satisfy ourselves whether these oaks were really hybrids and if so what species were to be regarded as their putative parents.

It should be premised that on both these trees (which I am now satisfied proceed from a single root, although separate at the base) the lower leaves differ widely from the upper ones, the former being much larger and either entire and oblong or only slightly lobed or angled at the apex, thin and green both sides. I had frequently met in that locality with trees bearing none but these large, thin, smooth, oblong leaves which I had attributed to the effect of shade upon the true *Q. imbricaria*. At no great distance from these trees were found specimens of *Q. imbricaria*, *Q. coccinea* and *Q. palustris*. A little way off we came upon a spot where there stood a large and typical tree of each of these species, the three trees forming a regular triangle, and just in the center of this triangular space there grew what appeared to be another double tree somewhat smaller than that which I have so often visited. I had frequently seen these before and observed that they bore the large and thin, smooth leaves with the outline of those of *Q. imbricaria*. We now observed that the larger of the two trunks bore leaves resembling the lower leaves of our *Q. Leana*, i. e. mostly lobed or angled at the end. On looking carefully up into the tops of these trees manifest signs of lobation were visible in the leaves even of the smaller trunk. This was, however, confined to the apex and often amounted to nothing more than an irregular obt truncation. On the larger trunk the leaves were very decidedly lobed among the upper branches quite clearly approaching those on the fruiting ranches of the typical *Q. Leana*. As neither of these trunks had as yet commenced bearing fruit it seems very probable, as Dr. Vasey remarked, that at their maturity the leaves of these trees will assume the normal form of the hybrid.

The fact that *Q. palustris*, which was present, belongs to so distinct a group of oaks, with the shallow cup, seems to be tolerably conclusive against this hybrid having sprung from the union of that species with *Q. imbricaria*, and the only remaining explanation makes these trees a cross between the last named species and *Q. coccinea*, which was the conclusion at which I arrived on first discovering the other pair, and which is expressed in the paragraph quoted at the outset.

Recurring now to the question whether these trees are really hybrids or not, it seems as if no rational mind, brought into actual contact with the facts as they presented themselves in their plain, straightforward way, could resist the conviction that the pollen from a lobed-leaved form had fertilized the stigmas of the entire leaved form, or

vice versa, and that these variable, intermediate, and unstable states had sprung from acorns thus crossed. And this is the consideration which I wished specially to emphasize. It is often and truly said that persons unfamiliar with any special branch of natural science are incapable of appreciating the nature and force of scientific convictions. This would be pre eminently true in this case. Standing in the presence of these forest denizens, I felt that they were speaking to me and revealing to me the secret of their conception, birth and life, in a language more potent and convincing than any words or voice could make it.—LESTER F. WARD.

TIMBER LINE IN THE SAWATCH RANGE.—That part of the main range of the Rocky Mountains known as the Sawatch Range has a general north and south direction with spurs running east and west between which the different streams find their way into the Arkansas or Gunnison Rivers.

The direction of the spurs and range is important, as by it the height of the tree line is in great part determined.

Timber line is generally at an altitude of nearly 12,000 feet above sea level, but in some localities may be lower than 11,000 feet. *Picea Engelmanni* forms the great mass of the forest at high altitudes, sometimes *Pinus aristata* is quite plenty and in some places there are a few tree of *Pinus flexilis* and rarely the Aspen comes to be a member of the high alpine woods.

Close to timber line are found the largest trees and most magnificent forests of Engelmann's Spruce and there is not the gradual decrease of size and vigor that the cold of an arctic climate should cause.

A few steps and one passes from a dense forest to a treeless region extending to the summits.

Engelmann's Spruce will not grow on the rocky slides so common in the Rocky Mountains, nor in a very wet location, but an excess of moisture does not influence the altitude of timber line.

Most of the summits of the very high peaks, such as Antero, Ouray and Princeton, are nearly clean rock, surrounded by "slides," and their tree line is determined by conditions of soil; and many of the lesser peaks also have an apparent tree limit caused only by rocky summits.

The scattered trees finding a foot hold on the steep sides of such peaks, not having the protection against the elements, that in a forest one tree gives to another do not grow at as high an altitude as the soil would permit. The main agents in preventing the forest from crossing the "divides" are the snow and wind.

Some idea of the power of snow at high altitudes may be imagined by noticing the paths of the "snow slides," or avalanches, swept clean of trees from the summit to the base. At one place near Mt. Antero, where an avalanche had come down, the trees from the mountain side were piled up twenty feet high for a distance of five hundred feet. Near tree line, where there has been no downward